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RADIO
STEERING
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules	)	WT Docket 95-102
to Establish a Very Short Distance	)	(RM-8499)
Two-Way Voice Radio Service	)	

Comments Filed in Response to a Notice of Proposed Rule Making

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Date: October 2, 1995

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Executive Summary

If there is indeed a need for a new, *very-short-range*, family-oriented, two-way voice radio service, then it should be located where the spectrum itself and alone is likely to permit only limited communications range. Historical experience clearly and painfully demonstrates that attempting to limit communications range primarily by limiting transmitter power is *a recipè for abuse and conflict.*

In particular, the spectrum should be chosen to assure that interference to similar but licensed and relatively longer-range communications will not occur. The 460 MHz spectrum currently used by the General Mobile Radio Service is inappropriate for the stated purposes of a new family-oriented radio service.

Hardware and technology requirements and limitations should be chosen to assure operator compliance with the rules and the intended uses of these radios. Experience with existing personal radio services provides significant guidance for additional hardware restrictions.

I. Background of the Commenter.

The Personal Radio Steering Group, Inc. (PRSG) is an all-volunteer, not-for-profit corporation established in 1980 by licensees in the General Mobile Radio Service (GMRS, FCC Part 95A) to provide services to and to serve as an advocate for the GMRS personal-use community. The PRSG is the continuation of the GMRS Task Area of the Congressionally-chartered FCC Personal Use Radio Advisory Committee (PURAC, 1976-1978).

The PRSG has published more than 300 different guides to GMRS licensing, technology and operating practices. PRSG's flagship publication, the **GMRS National Repeater Guide**, lists the more than 3,000 GMRS repeaters, their sponsors, technical characteristics and detailed coverage information. The Guide has become the essential reference to this cooperative, nonprofit communications network for licensed private individuals. PRSG also works closely with major land mobile equipment manufacturers to disseminate instructional materials for radio purchasers.

The PRSG tracks GMRS applications and grants. We provide 24-hour on-line access to the national GMRS licensing database of over 35,000 stations, in support of the FCC requirement that all system licensees must cooperate in the selection and use of channels.[1] PRSG staff members and volunteers regularly answer questions about GMRS licensing and usage over the Internet and other national computer networks.

II. The 460 MHz Spectrum is a Poor Choice for a "Very Short Distance" Radio service.

The lower portion of the UHF spectrum (below 900 MHz) is a poor choice for an allegedly "*very short* distance" radio service. Most GMRS handheld radios operate with nearly comparable transmitter power output (in the 1-watt to 3-watt range) as that proposed for the FRS (0.5 watts). These GMRS units routinely communicate with repeaters 20 to 40 kilometers away. Some

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1 §95.7(a).

GMRS repeaters have coverage ranges in excess even of these levels, depending primarily on their relative height advantage over the surrounding terrain.

Communications range at UHF and higher frequencies is determined primarily by antenna height of the corresponding stations, and to a somewhat lesser extent by topography and environment. For example, GMRS users have reported experiences where repeater transmitters have failed, resulting in power output of substantially less than one watt. Users noted that the range of the repeater systems were affected only because of the poor signal penetration.

The *NPRM*[2] suggests that the intended "quality communications" range of the FRS is about one kilometer. This range will be substantially exceeded under common FRS "open-field" operating conditions. In any case, it is *incorrect* to characterize the 460 MHz band as providing merely "line-of-sight propagation."[3]

The Commission has previous, *disastrous* experience in creating an allegedly short-range personal radio service. When the Commission reallocated a portion of the 27 MHz band to the newly created Class D of the Citizens Radio Service in 1957, the Commission alleged that communications could be limited in range by restricting permissible transmitter power. Experience has shown that limiting transmitter power *alone* is not an appropriate or sufficient means of limiting communications range.

In this *NPRM*, the Commission *again repeats this mistake*, alleging that limiting transmitter power *alone* is sufficient to restrict operating range. Extensive GMRS user experience demonstrates that even at power levels of one watt and less, communications with (and interference to) stations at much greater distances is possible.

A more appropriate choice would be *above* 900 MHz. Indeed, that is where the Rules already have extensive provisions for low-power, low-cost, short-range unlicensed products. For

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2 *NPRM* at ¶8.

3 *NPRM* at ¶8.

instance, spectrum at 2.4 GHz is already available for certain types of low-power, unlicensed two-way voice operation under the provisions of Part 15 of the Commission's Rules, and the technology is now readily available to support a consumer-level product operating in this range.

Locating the FRS at 2.4 GHz would have other operational advantages for the kind of service envisioned in Tandy's *Petition* (RM-8499) and in this *NPRM*. Communications *inside* buildings, such as at shopping malls, would be superior at 2.4 GHz compared with 460 MHz. Signals with the much shorter wavelength at 2.4 GHz would more readily penetrate and propagate inside building structures. Transceivers employing a one-watt, spread spectrum signal could be produced with soon-to-be-available hardware, and at consumer-level prices in the quantities envisioned. Moreover, this kind of emission would provide for more secure communications, suggested in the *NPRM*[4] to be desirable for the FRS.

Neither the original petitioner nor the Commission has constructively considered other spectrum alternatives that would be more appropriate for the intended use and less disruptive of existing licensed communications systems.

III. The *NPRM* Proposes Inconsistent Technical Standards.

The bandwidth restrictions proposed in the *NPRM* for FRS operations[5] are inherently inconsistent. The bandwidth of a signal from a GMRS transmitter can be 16 KHz wide (±5 KHz deviation, in addition to ±3 KHz from the significant audio sideband envelope). With a frequency stability of ±0.0005%, an additional ±2.325 KHz (0.0005 x 465 MHz), or a total of 4.65 KHz, must be included in the same overall permissible envelope.

This results in an overall envelope dimension (including the excursion for frequency stability) of 20.65 KHz. To reduce this to the proposed 12.5 KHz, there would have to be radical

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4 *NPRM* at ¶8.

5 A maximum of 12.5 KHz bandwidth. See *NPRM* at ¶11, and proposed §95.631(c) and §95.635(a).

reductions in permissible deviation and/or audio sidebands, and/or a much tighter frequency stability. Significant changes in any of these three parameters would require a technical design more sophisticated, more complex, and more costly than that employed in current production model GMRS transceivers.

For instance, merely reducing the maximum permissible deviation from ±5 KHz to ±2.5 KHz would achieve a practical reduction of only 5 KHz total, to an overall spectrum envelope of 15.65 KHz, still in excess of the 12.5 KHz proposed in the *NPRM*.

The use of the 12.5 KHz "splinter frequencies" in the Part 90 services does not constitute a reason not to be concerned about the proposed FRS use of the 467 MHz interstitial frequencies in the GMRS spectrum. There are *major* differences between how use of the 12.5 KHz offset frequencies have been implemented in the Part 90 services, and how the *NPRM* proposes to implement them in the proposed FRS.

1) In the Part 90 services, operation on these splinter frequencies is specifically *secondary* to that on the 25 KHz-spaced primary channels. Users of the offset frequencies must cause no interference to, and must accept any lawful interference from, operations on those primary channels. In contrast, the *NPRM* fails to designate FRS as a secondary service.

2) In the Part 90 services, all transmitters must be licensed, and must be identified by FCC callsign. When interference does occur, the source can be more readily identified and attributed to specific stations or systems. Under the FRS, there would be no station identification, and no license to which to attribute the source of interference.

3) In the Part 90 services, operations even at 12.5 KHz spacing are only *transitional*, and consideration of much smaller channel spacings is the subject of vigorous inquiry and development in other FCC dockets. The implementation of existing NBFM technology in a consumer-level FRS service would complicate any similar evolution of technology within the GMRS *or* the FRS. Existing technologies would be locked into place by the sheer numbers of FRS radios involved, and, in the absence of a licensing requirement or a licensing

database, by the absence of any means to identify the users of and to mandate replacement of older, less spectrum-efficient hardware.

IV. The FRS Must be a *Secondary* Service to GMRS.

Tandy proposed[6] that the FRS should be *secondary* to licensed GMRS operations. The *NPRM* recognized this[7] but fails to propose any meaningful implementation of this concept. Because implementation merely of current NBFM technology in the FRS would create channels that (in the 462 MHz band) are identical to and (in the 467 MHz band) significantly *overlap* others available *exclusively* for GMRS operation, user conflicts will be inevitable. As a minimum, there must at least a regulatory provision that recognizes that FRS operations must be secondary to *licensed primary* GMRS operations.

V. FRS Hardware Design Must Make Rule Violations Difficult.

The *NPRM* proposes[8] that "the usage of the FRS units (should be regulated) through technical standards and type certification." The *NPRM* acknowledges[9] that Motorola and TIA both alleged that technical standards could be crafted that would adequately protect GMRS systems. Unfortunately, neither Motorola nor TIA has yet made any comprehensive recommendations for such technical standards.

The *NPRM* proposes few hardware requirements intended to accomplish this, but requests comments on standards to be considered. The PRSG proposes several hardware-based concepts that should be considered to minimize FRS interference to licensed GMRS operations.

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6 *Petition* RM-8499 at ¶11.

7 *NPRM* at ¶4.

8 *NPRM* at ¶9.

9 *NPRM* at ¶6.

V.1. Further Restrictions Should Be Placed on Antenna Design.

The PRSG agrees with the *NPRM*'s proposal that

> "The antenna must be an integral part of the transmitter, (and) have no gain . . . ."
>
> — *NPRM* at ¶11.

That will produce a hardware configuration that is merely comparable *in performance* to that of conventional GMRS transceivers, even though the latter have detachable antennas.

The requirement should go further. Although nominally not detachable *physically*, an external FRS antenna could still be coupled *electronically* to a device terminating in a conventional RF fitting (such as a BNC or TNC fitting). Such a coupling device (sometimes known as a "*jim*"), consisting merely of a metallic tube into which the FRS external antenna would be inserted, could be constructed out of readily available materials. The "jim" could be attached subsequently to a power amplifier or to an external antenna. (Home-brew devices of this type have previously been used to permit an RF coupling to an antenna that is not removable or that has a non-standard connection to the transceiver.)

Prohibiting any easy means of external attachment or coupling of the antenna is important. Power amplifiers are readily available for the frequency range proposed for the FRS, and are lawfully used on GMRS and adjacent frequencies. The Commission could not realistically ban their production or sale, as it does with amplifiers for transmitters in and near the 27 MHz band.

Therefore, the PRSG recommends that the antenna must be *internal* to the radio case itself, and that no protrusion or extension of the case, nor any coupling nor fitting on the case, be permitted that could couple RF energy to an outside attachment. Similar internal antennas are used on some models of cordless phones operating in the 902 MHz and 46/49 MHz Part 15 bands.

It is not clear that the requirement for vertical polarization[10] is necessary. Once the signal is deflected or reflected off some object in the environment, the polarity is essentially lost anyway.

Permitting polarizations other than vertical could result in *smaller* antennas more easily made solely *internal* to the FRS transceiver housing. The use of circular or other polarization would result in the radiation pattern being less directional, and being less prone to distortion or misdirection if the FRS transceiver was operated on its side.[11]

V.2. Additional Selective Calling Standards Are Needed.

Based on the substantial experience from GMRS, any devices that *mute* the receiver, to prevent reception of signals except from transmitters encoding a specific tone or signal, must be required to be *disabled* before the transmitter can be *enabled*. Consideration should also be given to requiring a minimum period for such disablement (for instance, at least 5 seconds) before the transmitter is enabled. Once the receiver muting is disabled, it should remain disabled until manually reset by the operator.

Only with such a configuration would there be any meaningful compliance with the necessary requirement (to assure channel sharing) that the station operator must monitor the channel before transmitting, and must yield to emergency communications.

V.3. An Automatic Transmitter Identification Code Should Be Required.

For there to be any meaningful opportunity for a GMRS licensee to be able to locate the source of interference from an FRS transmitter, the GMRS user must be able to identify the particular transmitter. Each FRS transmitter should be required to employ a unique Automatic Transmitter Identification Code (ATIC). Contemporary technology is well suited to allow the ATIC to be part of a selective calling protocol. FRS radios would selectively address one another by the manual selection of a code string based at least in part on the ATIC code.

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10 This is proposed in the modified language of §95.645.

11 Even the nominally omni-direction antenna of a GMRS handheld radio becomes highly direction in the horizontal plane when the radio is tilted 90°. This is a common procedure used with attempting to "DF" (direction-find) local noise or interference sources on GMRS channels.

We will comment on any selective calling proposal made in the comments to this *NPRM*, but we suggest that a Further Notice of Proposed Rulemaking, or perhaps a Negotiated Rulemaking Committee, would be the better forum to establish the ATIC transmission format. The ATIC would be based on the transceiver's serial number. In conjunction with the integrated selective-calling/ATIC system, FRS is an outstanding opportunity for inexpensive, efficient point-of-sale registration.

V.4. Other External Couplings Must Be Prohibited.

No FRS transmitter should be permitted to incorporate any coupling or fitting that would allow for external audio (any audio signal other than that perceived by its own *internal* microphone) to be transmitted. Similarly, no FRS transmitter should be permitted to have any external coupling that can externally or remotely control the transmit function (other than the radio's push-to-talk button). This would admittedly preclude the use of conventional *external* microphones (with their push-to-talk buttons), but the requirement is necessary to prevent FRS radios from being used for non-voice communications, or from being coupled with another radio receiver to operate as a repeater.

Without such a prohibition, FRS radios could be easily duplexed and configured to operate as a conventional (frequency-domain) repeater station (receiving on one frequency, and simultaneously transmitting that signal on another). Without such a prohibition, FRS radios could also be easily configured to operate as a "time-domain" repeater (utilizing the widely available external hardware for time-delayed or "store-and-forward" repeating).

Similarly, activation of an FRS transmitter should require physical depression of an integral "push-to-talk" button. "Voice activated transmission" (or VOX) should be prohibited. To permit VOX operation is an open invitation to use the FRS transceiver as a repeater station, in conjunction with some other receiver.

In addition, proposed rule §95.193 should have an additional section (f) that explicitly prohibits the operation of an FRS transmitter by remote control.

V.5. Transmission Time Must Be Limited.

The FRS channels will be shared. Permitting continuous transmitting would be inconsistent with the intent of a shared service. Some reasonable time limit needs to be established and should be incorporated *into the hardware*. Similar time-limit requirements exist for GMRS transmissions (§95.181(i)(15)) and for CB transmissions (§95.416), but the failure to require a hardware control to assure compliance results in violations. This mistake should not be repeated for FRS transceivers.

The PRSG recommends that a time limit of *60 seconds* of *continuous* transmission be incorporated into the hardware. A further minimum *latency period before reset* should also be considered, but the basic time-out requirement is essential. There should be the further requirement that the transceiver emit an audible warning of transmitter time-out. Similar requirements exist for marine radios (47 CFR 80.141(d)), and similar time-out and warning functions are already voluntarily incorporated into some GMRS radio models.

V.6. Use of CTCSS and DCS Signaling on the 467 MHz Interstitial Frequencies Should be Prohibited.

Most current GMRS repeaters can be activated only through the use of a CTCSS (continuous tone coded subaudible squelch) code or a DCS (digitally coded squelch) code on the mobile transmit signal.

Because the emission envelope of 467 MHz interstitial channels (467.5625 MHz, 467.5875 MHz, etc.) proposed for FRS non-repeater use overlap the emission envelope of those used for conventional GMRS repeater access (467.55 MHz, 467.575 MHz, 467.6 MHz, etc.) on the adjacent channels, the use of the CTCSS or DCS codes by FRS transmitters could cause the operation of GMRS repeaters. FRS transmitters should be specifically prohibited from using CTCSS or DCS encoding in the 467 MHz band. Otherwise, FRS transmissions on the proposed 467 MHz interstitial channels could cause unintentional or even deliberate activation of GMRS repeaters.

There are only a limited number of CTCSS and DCS codes available. In some more populated areas, all CTCSS codes are already in use on some or all channels. In a few of the largest metropolitan areas, all or nearly all of the DCS codes may also be in use on some channels. In order not to limit the development of new encoding/decoding systems for use in licensed GMRS operations, a prohibition against *all* forms of signaling should be considered for FRS transmitters when operating on any of the proposed 467 MHz channels.

VI. The *NPRM* Misunderstands or Misrepresents the Purpose of Licensing.

The purpose of licensing in *any* radio service is to control, and as necessary to restrict, who is eligible to use that spectrum, and for what purposes. The Commission has previously found[12] that the GMRS had become overrun by uses incompatible with personal and family communications. The changes in licensing and station operator eligibility implemented earlier were intended to and are just now finally having the intended beneficial impact on GMRS operations.

By the Commission's own statements, these changes intended to protect the GMRS spectrum were inherently tied to the *licensing process.*

The *NPRM* claims that the FCC

> "can not foresee any regulatory purpose that would be served by requiring operator or station licenses in such a radio service."
>
> — *NPRM* at ¶9.

FRS is supposed to be a *family*-oriented radio service, but the *NPRM* proposes to overlay this allegedly new service on top of an already existing, *family*-oriented radio service (GMRS) that the FCC has previously found to need to be protected *by the licensing process* from usurpation by non-personal and non-family interests.

The petitioner (Tandy Corporation) and the two manufacturers that filed comments supporting RM-8499 extensive advertise GMRS radios for use in the workplace, suggesting that licenses

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12 *Report and Order*, PR Docket 87-265, at ¶16 etc.

were available to companies and other non-personal entities. This directly contravenes the GMRS Rules[13] as well as the FCC's clearly stated intent that the GMRS should *not* become "the other Business Radio Service."[14]

Provisions for unlicensed operation of low-power devices already exist *in Part 15*. The FRS as an unlicensed, low-power, very-short-range service belongs *not* in Part 95, where (except for the RCRS and CBRS) stations or systems must be *licensed*, but in Part 15 (Radio Frequency Devices), where there are specific provisions for the uses exactly intended for the FRS.

In fact, there is Part 15 spectrum *currently available* for precisely such low-power, very short-range two-way voice communications, at consumer price points quite consistent with the proposed 462/467 MHz FRS. In addition to the 902 MHz and 2.4 GHz ISM bands, for example — where a full watt of power is authorized — the Commission has allocated the 2390-2400 MHz band to unlicensed devices, with rules that could be utilized to provide portable voice products. Yet there is no Part 15 use of this band to date.

Other former Federal bands in this same region became available to the Commission in August 1995, yet the FCC has commenced no proceedings to allocate them. The 1920-1930 MHz unlicensed voice PCS band is also appropriate for FRS type uses, yet has seen no commercial utilization.

In summary, there is a surfeit of alternative allocations for FRS, representing attractive commercial opportunities.

VII. Interconnection with the Public Switched Telephone Network Must be Prohibited.

Over the years many GMRS licensees have fancied the benefits from permitting GMRS interconnection with the public switched telephone network. The FCC has considered several

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13 §95.5.

14 *Report and Order*, PR Docket 87-265, especially at ¶13.

petitions and rulemaking proposals that would extend PSTN interconnection to the GMRS and to certain other private land mobile radio services.

The FCC has wisely chosen to deny this capability to the GMRS. Given the FM technology, the small amount of spectrum allocated to the GMRS could not support the telephone traffic. Interference problems would be exacerbated by the demand. Only with spectrum-efficient digital technology, which the FCC now explicitly proposes to deny to FRS, could either of these services even contemplate PSTN interconnection.

VIII. The FRS Channel-Numbering Plan Fails to Identify Interference Potentials.

The channel numbering plan proposed for §95.627 would not indicate which GMRS channels are closest in frequency. GMRS users usually refer to the three digits to the right of the frequency pair (in MHz) as the channel designation. For instance, the 462.550/467.550 Mhz channel pair is commonly called "the five-five-zero channel" or "the five-fifty channel," etc. GMRS user identification of interstitial channel is not so uniform, sometimes using the 4-digit sequence to the right of the decimal (channels 5625, 5875, etc.) or to the next higher or lower *primary* channel ("half up from 550" referring to 462.5625 MHz, etc.).

The numbering scheme proposed in §95.627 assigns a title completely without reference to the adjacent GMRS primary channels, and ignores the distinction between those channels in the 462 MHz band and those in the 467 MHz band.

IX. The Minimalist Restrictions Must Prohibit Additional Undesirable Operations.

In an effort to keep the FRS rules simple, the *NPRM* proposes to omit reference to uses and practices prohibited in the GMRS and in the CBRS. This absence would suggest, for example, that the prohibitions established at §95.181(i) do not apply to the FRS.

We believe that these prohibited practices specifically listed in §95.181(i) should also be specifically prohibited in the FRS rules.

X. GMRS Repeater Operators are Concerned about Interference.

In the *Report and Order* in PR Docket 87-265, the FCC recognized the importance of protecting the 467 MHz frequencies used by low-power GMRS handheld transceivers transmitting *to* a repeater station. In that *R&O*, use of the 467 MHz GMRS frequencies was restricted *solely* to repeater access and control.

Many current GMRS repeaters employ enhanced receiver circuits to boost the signals monitored on these 467 MHz *input* frequencies. This routinely enables conventional full-power (50-watt) repeaters to communicate *reciprocally* with low-power (typically 1-watt to 3-watt) handheld radios.[15]

The *NPRM* proposes to permit FRS operations on spectrum that *overlaps* these sensitive repeater frequencies. The *NPRM* makes a fundamental mistake when it identifies[16] these frequencies as being "repeater *transmitting* channels" [*emphasis* added]. Instead they are repeater *receiving* channels, the same ones carefully protected from non-repeater use by the changes adapted in the *R&O* of PR 87-265.

GMRS repeater licensees and users are *extremely concerned* about the potential for this interference to sensitive repeater-input signals from the proposed overlapping FRS channels in the 467 MHz band.

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15 *Reciprocal operation* refers to an operating configuration in which the two stations, in this case the repeater and the user-held radio, can hear each other with approximately the same clarity and "quieting" (signal strength). This reciprocity can be achieved because the repeater station, with its higher power *transmitter*, benefits from an enhanced-sensitivity *receiver*. Reciprocity between 2-watt handheld radios and 50-watt repeaters is routinely accomplished using merely conventional, state-of-the-art technology. A similar degree of reciprocity, with a similar imbalance of transmitter output powers between the land station and the mobile station, is also common in other radio services, including in the Cellular Radiotelephone Service.

16 *NPRM* at ¶4.

When PRSG first proposed non-repeater use of the 462 MHz interstitial channels, this interference was acceptable because most stations *receiving* on the interstitial frequencies in this band would be surface-level mobile (vehicular or portable) stations. The interference potential would be further minimized by allowing the operator *receiving* interference to switch to any other interstitial frequency.

But the situation is *entirely different* in the 467 MHz band. *All* GMRS stations receiving signals on the conventional frequencies are *repeaters* operating on *assigned* channels, with antennas usually located at high elevations to provide extended coverage for low-power handheld transceivers. If use of the overlapping 467 MHz interstitial frequencies were to be permitted, the repeater stations *suffering* interference would not be able to change channels. In addition, the stations *causing* interference would be totally unaware of the situation (and in an unlicensed service, totally unmotivated to change to alternative frequencies).

A PRSG member has prior operational experience on a 467 MHz GMRS interstitial frequency. Under the authority of a license in the Experimental Radio Service, extensive testing was conducted. This experience demonstrated that substantial interference to the repeater receiver could be avoided only by careful system design, placement of antennas for isolation, horizontal polarization, etc. Interference was eventually minimized by reducing the transmitter deviation to less than 3KHz, with power output levels reduced to approximately 200 milliwatts.

Of special significance is the fact that subaudible tone present on the interstitial frequency often *did* activate the repeater transmitter. The present FRS proposal should be anticipated to have the same results, not only causing untoward interference to GMRS operations, but also to FRS operations on 462 MHz interstitial channels due to such unintended activation of GMRS repeaters by FRS users on the 467 MHz interstitial channels.

Therefore, FRS operation on the overlapping 467 MHz interstitial frequencies would be *extremely disruptive* to repeater receivers. The stations being interfered with would be unable to

change channels. The stations *causing* the interference would be unaware of their impact, and would have no particular motivation to change channels.

The *NPRM* states:

> "Each channel would be usable simultaneously by *many millions* of small groups throughout the country."
>
> — *NPRM* at ¶8, *emphasis* added.

Thus, if only the seven interstitial frequencies in the 462 MHz band were to be authorized for use by the FRS, there could be *seven times many millions* of such simultaneous communications, by the Commission's own calculations. Nowhere in the *Petition* nor in the *NPRM* is there any suggestion that this capability of supporting *seven times many millions* of simultaneous communications would be insufficient to meet the needs of a fully implemented FRS.

Therefore, the PRSG requests that if the FRS is implemented in the GMRS band at 460 MHz, that it be permitted to use *only* the interstitial frequencies in the 462 MHz band (from 462.5625 to 462.7125 MHz, at 25 KHz increments — the so-called channels 1 through 7 in the proposed §95.627 channel-numbering scheme), and *not* those in the 467 MHz band (from 467.5625 to 467.7125 MHz, at 25 KHz increments — the so-called channels 8 through 14 in that proposed scheme).

XI. The Commission has Exceeded Its Congressional Authority in Proposing to Delicense a Portion of the GMRS Spectrum.

The FCC claims that the authority to delicense a portion of the spectrum allocated to the General Mobile Radio Service was granted by Congress.[17] When the Commission requested this authority, it misrepresented this action as being *non-controversial*, when in fact there was *much controversy* about this action.

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17 *NPRM* at ¶9 and in footnote 26.

When the differing Senate and House versions of the amendment of the Communications Act were reconciled in Conference Committee, the Conferees established an obligation for the Commission to continue active enforcement of CB rules.

> "The Conferees wish to emphasize that this provision authorizes only the 'delicensing' (of individual licenses) of the CB and RC services, and not the 'deregulation' of such services. The Conferees fully intend the Commission to vigorously enforce the Communications Act and FCC rules relating to the CB and RC services, and to use its forfeiture authority against violators where necessary. Since the Commission would no longer have the ability to revoke a CB license if it chose to de-license this service, forfeiture authority should be exercised in a way that demonstrates a commitment to preserving the integrity of the CB service through enforcement. In addition, the authority granted to the Commission in section 4 of this legislation to utilize CB volunteers will provide additional Commission resources to safeguard the integrity of the service."

At the time that this authority was granted (1982), the General Mobile Radio Service was distinct and separate from the Citizens Band Radio Service, and was *not* included in this authority. The Commission's claim now that it has the authority to delicense a service that was specifically excluded from the list of services authorized to be delicensed is an abuse of administrative discretion.

In addition, the Conferees explicitly stated that the delicensing authority was *not* a grant to *deregulate* the CBRS, and that a full and vigorous program of enforcement must continue. The Commission has violated both charges. Through inattention and deliberate neglect, the Commission has both deregulated and ceased all meaningful enforcement of the CB rules.

Given this track record, the Commission can hardly claim now that it has the authority to delicense a radio service that was, by exclusion, prohibited from being delicensed under this Congressional authority.

XII. Other Considerations.

The *NPRM* raises other issues that should also be considered.

XII.1. Equipment Cost is *Not* a Major Consideration in Proposing the FRS.

Tandy's *Petition*[18] and now the *NPRM*[19] imply that FRS radios, at $100 to $150, would be less expensive than GMRS radios. The most popular GMRS radio models on the market today retail for under $200, and some models have been advertised for under $100. The argument that equipment cost is a major deterrent to GMRS expansion or use by the potential FRS user is not valid.

Maxon, a major manufacturer of GMRS transceivers, has just introduced a limited-power (100 milliwatt) GMRS radio that will operate on GMRS *primary* channels, and therefore will require a conventional GMRS license even if FRS is implemented. On the basis of other Maxon radios being sold through mail-order vendors, the anticipated end-user cost of this limited-power radio would be expected to be about $100.

By introducing this radio, Maxon clearly anticipates that a viable market for low-power, *licensed* GMRS radios will exist within or even below the price point anticipated for FRS radios.

XII.2. GMRS Licensing Complexity *Is* a Major Consideration.

Instead, the licensing process is what Tandy and others[20] have really complained about.

PRSG certainly agrees that the current GMRS licensing process is more cumbersome that it needs to be. But this is attributable in large part to the fact that the GMRS licensing process has (at least until recently) been locked into using a form and an application screening process that were both designed for other private land mobile services with far more complex licensing requirements. Now that GMRS is the only service that continues to use the FCC Form 574 for applications, that Form could be modified and vastly simplified for GMRS use.

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18 *Petition* at I.

19 *NPRM* at ¶2.

20 Including Motorola and others represented by TIA. *NPRM* at ¶6.

Indeed, PRSG personnel have made *several* presentations to FCC staff in the past decade advocating such a redesigned form, and we have submitted samples for FCC consideration. The FCC has yet to take action to simplify the GMRS licensing procedure.

Significantly, the GMRS licensing process is the means by which the Commission has chosen to create the restrictions that it found to be necessary[21] to protect this *personal* radio service from being overrun by users and uses more appropriate for other radio services.

XII.3. The "Capture Effect" of FM Signals Will *Increase*, Not Decrease, the Potential for FRS Interference to GMRS Operations.

The *NPRM*[22] claims that the "FM capture effect" will benefit GMRS operations over FRS ones, because of the higher transmitter power authorized for GMRS radios.

This is incorrect. The vast majority of GMRS handheld radios have transmitter power levels only insignificantly greater (3 to 6 dB) than the maximum proposed for FRS transmitters. This minor power differential will be not nearly as important as *antenna height* and other topographic and environmental considerations. Closer-in or more advantageously located (even if low-powered) FRS transmitters will produce a *stronger* RF signal than more distant, modestly higher-powered GMRS transmitters, and will therefore capture over these licensed GMRS stations. The "FM capture effect will *not* benefit the slightly higher powered transmitter, but rather than more *advantageously located* one.

In the creation of other new radio services over the past decade, *nowhere* has the FCC argued that "the FM capture effect" justifies using this emission mode. Indeed, in almost all other *new* services, the FCC has required that newer, digitally based technologies be used. The FRS stands alone as being the only new service *forbidden* to use this new, more spectrum-efficient digital technology.

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21 *Report and Order*, PR Docket 87-265.

22 *NPRM* at ¶8.

XII.4. Selective Calling Does *Not* Provide Added Privacy.

Selective calling/muting merely allows the operator of the radio so equipped to ignore other co-channel communications until his or her individual radio is called.

GMRS and FRS radios will certainly have the capability of monitoring "open squelch." Indeed, there is no way for the radio operator to comply with the pre-transmission monitoring requirement, necessary for channel sharing, unless the radios are so equipped.

Since all GMRS and FRS radios must have such a means of disabling the muting function, all radio operators have immediate access to monitoring all other communications. Selective calling provides no *privacy* whatsoever, contrary to the claim made in the *NPRM*.[23]

In addition, the *NPRM* incorrectly argues[24] that the use of selective calling protocols would help the FRS to share frequencies with GMRS licensees, suggesting that these protocols would *reduce* interference. This statement reflects a misunderstanding of technology and an absence of real-world experience. Selective calling, or selective muting, doesn't *reduce* interference, it *conceals* it. Channel-blocking and communications-disrupting interference is still there, but operator awareness of its presence and severity is *concealed.* This can actually make *more difficult* the effort to identify, isolate and correct the problem.

XII.5. The Length and Modulation of Non-Voice Signaling Should be Limited.

Proposed rule §95.193(b) would permit the transmission of an audible tone (defined as being more than 300 Hz) up to 15 seconds at a time, and the transmission of a subaudible tone (300 Hz or less) continuously but only while the station operator is talking.

This language perpetuates the mistaken concept that the audibility of a tone is determined solely by its pitch. Audibility is also determined by its deviation level (for an FM signal) relative

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23 *NPRM* at ¶8.

24 *NPRM* at ¶8.

to that of the voice also being modulated. For instance, a tone of 2 KHz but with a deviation of less than one-tenth that permitted for the voice would also be inaudible in reality, but not according to this rule.

The proposed language derives from that in other radios services (including especially the GMRS[25] in which some form of remote control is authorized. In the GMRS, for example, subaudible tone signaling is used for remotely controlling a mobile relay (repeater) station. In these remote-control applications, *continuous* transmission of a subaudible code is necessary for the *continuous* control of the remote station.

In the FRS, such repeater stations are not permitted, and the FRS is not permitted otherwise to be used for non-voice communications. Therefore, there is *no reason to permit continuous transmission* of even subaudible tones or codes, whether that signaling is subaudible by pitch or by deviation level.

Non-voice signaling by FRS transmitters should be permitted *only* for *establishing* communications, not for *continuing* communications. Once the communications link has been established, all parties to that communications exchange need to switch to *unmuted* reception, in order to comply meaningfully with the requirements to monitor before transmitting and to yield to any emergency communications.

To permit continuous subaudible signaling in the FRS would encourage its use for other than *establishing* communications. For instance, it would encourage parties engaged in a communications exchange again to mute their receivers (or to attempt to leave their receivers in a muted condition) and thus be unable to determine the nature of other co-channel communications, including those potentially concerning an emergency.

Based on extensive field experience of GMRS licensees, PRSG recommends that the language of §95.193(b) instead limit the length of signaling to a maximum of *five* continuous

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25 §95.181(f & g).

seconds, and that no exemption be provided for signals based either on the pitch or the deviation level of that signaling.

The only exemption that should be provided should be in conjunction with some form of Automatic Transmitter Identification Code (ATIC), as discussed in Section V.3 above.

XII.6. FAA Regulations Significantly Restrict Use of GMRS and FRS Radios.

The language proposed for the new §95.192(a)(3) continues the misimpression suggested by other FCC rules[26] that the captain of the aircraft is *always* the ultimate source from which to obtain permission to operate a radio. This is not true.

When aboard an aircraft being operated *in controlled airspace*, FAA Regulations establish restrictions on what radio equipment may be used. The captain of the aircraft does *not* have the authority to permit the operation of non-FAA-approved transmitters in such situations.

XII.7. FRS Radios Should Be Required To Be Crystal Controlled.

In proposing that FRS transmitters *not* be required to be crystal controlled[27], the Commission has given no justification for relaxing this requirement. In the case of R/C stations transmitting in the 26-27 MHz band, the frequency tolerance is sufficiently generous to permit the use of non-crystal-controlled RF circuits. Nowhere in the *Petition* or in the comments submitted to it did any party request a relaxation of the requirement for crystal control.

In the absence of such a request or justification, this exemption should not be granted.

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26 Notably §95.23(c) and §95.405(c).

27 *NPRM*, at the proposed §95.649.

XIII. CONCLUSIONS AND RECOMMENDATIONS.

The thrust of the Tandy *Petition* and of this *NPRM* is not to create a *new* service. Instead, it is a thinly veiled attempt to delicense a portion of an existing, viable, *licensed* personal and family-oriented radio service (GMRS) in order to compromise the protections that the Commission has previously found are necessary to ensure that this spectrum is used for its intended purposes, and that it not be overrun by uses and users that are more appropriate elsewhere.

If there is a need for personal and family communications that cannot be met under existing rules and with existing equipment selection, then these communications capabilities should be established in an entirely new radio service, in an entirely *different radio spectrum* more appropriate for the very-short-range nature proposed. Rules and spectrum allocations already in existence could accommodate these allegedly new uses, without any compromise and threat to the existing, *disciplined* operations of the licensed General Mobile Radio Service.

If the FRS is created, wherever it might be in the spectrum, the rules must create hardware and technological requirements that will help assure operator compliance with the rules and with the intended use of these radios.